
ENVIRONMENTAL Fact Sheet



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Water Efficiency Practices for Golf Courses

Irrigation of turf grass is a water use-intensive practice, so conservation techniques can help reduce demands on surface and groundwater supplies. Water efficiency practices lower the long-term costs of irrigation and ensure sufficient supplies are available for future use and the environment.

Irrigation water efficiency practices utilize techniques that minimize water losses while satisfying turf grass water use needs. Water losses typically include evaporation, deep percolation and runoff. The water conservation practices listed in this fact sheet help control losses through implementation of efficient irrigation technology, effective irrigation scheduling, soil moisture determination and retention, low-flow plumbing and other water-saving practices.

General Water Efficiency Practices

The following general water efficiency practices apply to all areas of the facility.

- Develop a water system maintenance program. Routinely inspect all plumbing fixtures, appliances, pressure regulators, water lines, valves and pumps for leaks. Keep replacement and repair parts on hand. Metering different areas aids leak detection.
- Sweep parking lots, driveways, walks, patios, decks, and steps rather than hosing them off.
- Turn off water when not in use.
- Recycle water for other purposes wherever possible. For instance, water used to rinse dishes in the kitchen could be piped to a cistern and reused to water landscape plantings.

Irrigation Efficiency

Proper use and maintenance of your sprinkler system can save both water and money.

Evaluate the following sprinkler irrigation practices and technologies and incorporate the most efficient and feasible into your irrigation designs.

- Design an irrigation schedule.
 1. Determine your soil type. Soil characteristics help identify effective irrigation application rates, duration and frequencies.

2. Determine weekly precipitation amounts. Install a rain gauge in a central location in an open area where overhanging plant material won't divert rain from the gauge. Though local radio and TV weather services can give you general precipitation rates for the week; site-specific information will be more accurate. Avoid watering just before a rain event.
3. Check soil moisture to determine watering needs. Soil moisture sensors are useful in determining how wet your soil is. In some instances you will find that you do not need to water even if it has not rained recently. Soil moisture can be measured with tensiometers, electrical resistance blocks ("gypsum," "ceramic" or "moisture" blocks) or neutron probes.
4. Determine each turfgrass variety's water quantity needs. Withholding water at early growth stages can sometimes increase root depths and drought resistance.
5. Measure the output from your irrigation devices. Use flow meters or gauged water pans to measure the output of sprinklers and drip irrigation heads.
6. Combine the five pieces of information above to determine a week-by-week irrigation schedule outlining irrigation frequency, volume and duration for each type of turf. For example: $\text{Irrigation/wk} = \text{turfgrass water needs/wk} - \text{present soil moisture} - \text{rainfall/wk}$. Update the schedule as weather and soil moisture conditions change. Irrigate so that water penetrates only to the depth of the root zone.
7. Recheck soil moisture 1-2 days after irrigation to determine depth of applied water and uniformity. If water penetration is too deep, too shallow, or spotty adjust your irrigation schedule to correct it.

- Sprinkler heads should be spaced so that excessive overlap does not occur.
- Make sure that sprinkler heads on the same circuit match. Mismatched heads deliver water at different rates and may perform differently. Mixing types of sprinkler heads wastes water.
- Remove any obstructions to the spray pattern.
- Inspect sprinkler nozzles to ensure they are not clogging, are operating properly and distributing the water uniformly.
- Adjust spray pattern to irrigate only the area desired and avoid overspray onto walkways, pavement, and other non-irrigated areas.
- Use pressure regulators to assist with uniform water distribution throughout irrigation systems and evaluate pressure to better control application rates.
- Adjust the pressure or install a new regulator if sprinkler heads are misting.
- Use timers, automatic shut off valves, rain sensors and other such devices to help ensure over-watering does not occur.
- Upgrade, replace or computerize your irrigation system.
- Water at night or early in the morning to reduce evaporation losses.
- Utilize drip or trickle irrigation where possible.
- Spot water if entire area isn't dry.
- Eliminate irrigation wherever possible, such as the rough.

- Employ mulches wherever possible.
- Utilize drought-resistant turfgrasses that require less irrigation and maintenance. Kentucky bluegrass, a popular turfgrass that despite its name was developed in England, needs a moist environment to thrive. Employing this type of grass in golf courses and lawns wastes a great deal of water.
- Incorporate moisture retentive polymers in the soil. Though traditionally used in container plantings, these polymers are presently being tested by some golf courses to cut down on irrigation demands.

Domestic/Sanitation Water Efficiency Practices

The following water efficiency practices apply to the bathrooms, water fountains, and general maintenance areas at your facility.

- Install ultra low flow toilets (ULF) that use a maximum of 1.3 gal/flush (6.0L/flush) or retrofit existing toilets with displacement bottles or dams. Install ULF urinals that use a maximum of 1.0 gal/flush, (3.9L/flush) or utilize waterless urinals.
- Install low flow faucet aerators or laminar flow restrictors that limit flow to <2.5gpm.
- Install low flow showerhead devices that limit flow to <2.5gpm.
- Install flow restrictors on plumbing fixtures wherever possible.
- Install automatic faucet shut off valves in public water use areas.
- Replace older model piped-in drinking water fountains with stand-alone water coolers/dispensers.

Kitchen/Cafeteria Water Efficiency Practices

The following water efficiency practices apply to facilities that provide food services to their customers.

- Minimize pre-wash spray systems and replace spray heads with low flow models.
- Use high pressure, low volume nozzles for increased cleaning efficiency.
- Install automatic shut off valves or shut off water when not in use.
- Remove garbage disposals or reuse wash and rinse water for disposal purposes. Composting food waste is the most practical disposal method for water conservation and nutrient recycling.
- Replace water-cooled machines with air-cooled models or recirculating non-contact cooling systems.
- Upgrade to water-saving machinery as old equipment wears out.
- Install on-demand point-of-use water heating systems to eliminate the need to purge lines for hot water. Insulate pipes to retain heat.

- Operate dishwashers with full loads only and shut them off when not in use. Install sensors on conveyor systems that automatically shut off water when no dishes are present.
- Utilize high temperature rinse dishwashers rather than low temperature ones as they require less water and wash more racks per hour.
- Consider using ultrasonic pre-rinse units.
- Pre-rinse utensils and dishes in a water basin.
- Rinse vegetables in a water basin.
- Reuse rinse water where appropriate for pre-rinsing, dish washing, garbage disposers, or scrapping troughs.
- Eliminate or minimize water flow through scrapping troughs.
- Do not use running water to melt ice or frozen foods.

For Additional Information

Please contact the Drinking Water and Groundwater Bureau at (603) 271-2513 or dwgbinfo@des.state.nh.us or visit our website at www.des.nh.gov/dwgb. All of the bureau's fact sheets are on-line at www.des.nh.gov/dwg.htm.

Golf Course Superintendents Association of America. Technical papers on various aspects of golf course water use. www.gcsaa.org/resource/envirom/watercon.html

North Carolina Cooperative Extension Service. Detailed fact sheet for golf course superintendents that covers most water resource aspects relating to the construction and establishment of golf courses. www.ces.ncsu.edu/TurfFiles/pubs/wqwm154.html

Reference:

_____; *MRI Water Conservation Technical Bulletin #7, Water Conservation Best Management Practices for Landscape and Turf Management*; New England Interstate Water Pollution Control Commission, Wilmington, MA; 1996.

_____; *MIL-Handbook-1165, Water Conservation*; US Dept. of Defense; 1997; 67-68.

Note: This fact sheet is accurate as of January 2007. Statutory or regulatory changes, or the availability of additional information after this date may render this information inaccurate or incomplete.